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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,410	07/30/2003	Richard M. Fuller	10389US01	9010

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Attention: Eric D. Levinson
Imation Corp.
Legal Affairs
P.O. Box 64898
St. Paul, MN 55164-0898

EXAMINER

UHLIR, NIKOLAS J

ART UNIT

PAPER NUMBER

1773

DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/630,410	Applicant(s) FULLER, RICHARD M.	
	Examiner Nikolas J. Uhler	Art Unit 1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/20/2003</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Information Disclosure Statement

1. The examiner has considered the information disclosure statement (IDS) dated 10/20/2003. A signed and initialed copy of the IDS accompanies this office action.

Claim Objections

2. Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 3 requires the support layer of claim 1 to comprise an aluminum oxide in said pigment combination. Claim 1 requires the support layer to contain alumina, which is known in the art to be an aluminum oxide. Thus, claim 3 does not further limit claim 1.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 1, 3, 5-12, and 15-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Claim 1, line 4 recites "said at least one lower layer." There is insufficient antecedent basis for this limitation. The examiner suggests replacing "said at least one lower layer," with "said at least one lower support layer."

6. Claim 3, line 2 recites "said support layer." There is insufficient antecedent basis for this limitation. The examiner suggests replacing "said support layer," with "said at least one lower support layer."

7. Claim 12, line 2 recites "said lower layer." There is insufficient antecedent basis for this limitation. The examiner suggests replacing "said lower layer," with "said at least one lower support layer."

8. Claim 15, line 2 recites "said topmost magnetic layer." There is insufficient antecedent basis for this limitation. The examiner suggests replacing "said topmost magnetic layer," with "said magnetic upper layer."

9. Claim 16, line 2 recites "said primary magnetic pigment particles." There is insufficient antecedent basis for this limitation. The examiner suggests replacing "said primary magnetic pigment particles," with "said magnetic pigment particles."

10. Claim 17, line 2 recites "said primary magnetic pigment particles." While there is antecedent basis for the claim language in this claim in claim 16, there is no antecedent basis for the language in claim 16 in claim 1. Thus, The examiner suggests replacing "said primary magnetic pigment particles," with "said magnetic pigment particles" in claim 17.

11. Claim 18, line 2 recites "said primary magnetic pigment particles." There is insufficient antecedent basis for this limitation. The examiner suggests replacing "said primary magnetic pigment particles," with "said magnetic pigment particles."

12. The terms "hard," "soft," and "large," present in claims 6-11 and 18-24 are relative terms that render the claim indefinite. The terms "hard," "soft," and "large" are

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not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. How large is large? How hard is hard? How soft is soft?

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 1-10, 12-21, and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ejiri et al. (US5827600).

15. Regarding claim 1, Ejiri et al. (Ejiri) teaches a magnetic recording medium comprising a support, a lower non-magnetic layer on the support, and an upper magnetic layer on the lower non-magnetic layer (column 9, lines 3-15). The Ejiri medium is accurately described as a dual layer medium.

16. Ejiri refers to the lower non-magnetic layer as "layer a" (column 9, lines 50-55). As disclosed in sample 1-6, an exemplary layer a composition contains 100 parts by weight α -ferrite (a known synonym for α iron oxide), 5 parts by weight carbon black, and 5 parts by weight α alumina (see the table at column 54 and table 2 at columns 57-58). This corresponds to a pigment weight ratio of 90.9% iron oxide (100 parts iron oxide/110 parts total pigment). Thus, example 1-6 meets all of applicant's claim 1 lower support layer requirements.

17. Regarding the magnetic pigment required by claim 1. Ejiri refers to the upper magnetic layer as "layer b" (column 9, lines 50-55). Layer b is taught to be composed of at least a binder system and ferromagnetic particles (column 10, lines 34-45). Suitable ferromagnetic particles for use in layer b include ferromagnetic powders having an average major axis diameter of 0.005μ (5nm) to 0.3μ (300nm) (column 39, lines 15-25).

18. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize ferromagnetic particles having an average major axis diameter of 0.005μ as the magnetic particles in layer b of Ejiri, as Ejiri recognizes the equivalence of these particles to the others listed as suitable.

19. As the applicant has not required the magnetic particle to be any particular shape, the examiner considers the term "average major axis diameter" in Ejiri to be equivalent to applicant's claimed "average length." Thus, when particles having an average major diameter of 0.005μ are used in layer b of Ejiri, applicant's claim 1 limitations with respect magnetic pigment/binder system are met.

20. Regarding the resistivity requirement. Because the applicant has not defined what resistivity is intended to be covered (i.e. surface resistivity), the examiner has interpreted the term "resistivity" in claim 1 to be read on by "any" resistivity, so long as it falls within the claimed range. Bearing this in mind, Ejiri teaches that the surface resistivity of both layer a and the back layer (which is formed on the opposite side of the substrate from layer a and layer b) is preferably not more than $1 \times 10^9 \Omega/\square$, more preferably not more than $1 \times 10^8 \Omega/\square$. Thus, Ejiri meets applicants claim 1 resistivity requirement.

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21. Thus, all of the limitations of claim 1 are met.

22. Regarding claim 2, though example 1-6 utilizes 5 parts by weight carbon black, Ejiri teaches that the amount of carbon black used in layer a is 5-150% by weight, more preferably 10-100 parts by weight (based on the weight of the binder).

23. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize 10% carbon black in layer a of sample 1-6 taught by Ejiri, as the references specifically teaches that this amount of carbon black is suitable for use in lower layer a.

24. Claim 3 is met as set forth above for claim 1.

25. Claim 4 is met as set forth above for claim 1.

26. Regarding claim 5, sample 1-6 utilizes a combination of a vinyl-chloride and polyurethane as a binder for layer a. Thus, this limitation is met.

27. Regarding claim 6. Because the applicant doesn't define what constitutes "hard" and "soft" the examiner takes the position that the limitations of claim 6 are read on by any bonder composed of two or more different polymers, as one polymer will necessarily be "harder" or "softer" then the other. The binder taught by Ejiri for layer a is a mixture of vinyl chloride copolymer and polyurethane. Thus, this limitation is met.

28. Regarding claims 7 and 8, though sample 1-6 does not teach the T_g of the vinyl chloride copolymer and polyurethane utilized in layer a, in subsequent examples, Ejiri utilizes a vinyl chloride copolymer having a T_g of 71°C and a polyurethane having a T_g of 38°C (column 85, coating composition for layer a).

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29. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a vinyl chloride copolymer having a T_g of 71°C and a polyurethane having a T_g of 38°C as the binder resin system of layer a in Ejiri, as the reference specifically teaches examples utilizing this combination of polymers

30. Claims 9 and 10 are met as set forth above for claim 6.

31. Regarding claim 12, Ejiri teaches that layer a and layer b can additionally contain additives such as one or more lubricants (column 49, lines 44-67). Suitable lubricants/additives include fatty acids and fatty acid esters (column 49, lines 44-67). IN various embodiments, Ejiri utilizes a combination of butyl stearate (a known fatty acid ester) and stearic acid (a known fatty acid) in layer a (see example 6, column 71).

32. Therefore it would have been obvious to one of ordinary skill in the art at the time invention was made to utilize a combination of butyl stearate and stearic acid in the layer a of Ejiri, as Ejiri teaches that layer a can contain one or more additives such as lubricants, and teaches specific examples utilizing a combination of butyl stearate and stearic acid.

33. Claim 13 is met as set forth above for claim 12.

34. Regarding claim 14, Ejiri teaches that the lubricants need not be 100% pure, but the proportion of impurities contained in the lubricant is preferably 10% or less by weight (column 50, lines 30-40).

35. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize $\geq 90\%$ pure stearic acid in layer a of Ejiri, as Ejiri

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teaches the use of stearic acid as a lubricant and teaches that the lubricants should contains $\leq 10\%$ by weight impurities.

36. Regarding claim 15, Ejiri teaches that layer b preferably has a thickness in the range of $0.005\text{-}0.3\mu$ (column 51, lines 40-55). In specific embodiments, Ejiri forms layer b to a thickness of $0.2\mu\text{m}$ (column 83, table 17, samples 9-5 and 9-7).

37. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form layer a in Ejiri to a thickness of 0.2μ , as the reference teaches that layer b is preferably formed to a thickness of $0.05\text{-}0.3\mu$, and teaches specific examples where layer b is formed to a thickness of 0.2μ , which is completely encompassed within this optimal range.

38. Regarding claim 16, Ejiri teaches that magnetic powder exhibiting a coercive force of $1100\text{-}2500\text{ Oe}$ is suitable for use in layer b (column 44, lines 17-31).

39. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize magnetic particles having a coercive force of 2500 Oe in the magnetic layer taught by Ejiri, as the reference recognizes the equivalence of these particles to the others listed as suitable.

40. Claim 17 is met as set forth above for claim 16.

41. Regarding claim 18, Ejiri teaches that layer b comprises a binder, and teaches many examples wherein that binder is the same as or similar to the binder in layer a (see for example, the coating composition for layer b listed in the lower table of column 55). Thus, the examiner feels that the limitations of claim 18 are met for substantially the same reasons as set forth above for claim 6.

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42. Regarding claims 19 and 20, though sample 1-6 does not teach the T_g of the vinyl chloride copolymer and polyurethane utilized in layer b, in subsequent examples, Ejiri utilizes a vinyl chloride copolymer having a T_g of 71°C and a polyurethane having a T_g of 38°C (column 85, coating composition for layer b).

43. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a vinyl chloride copolymer having a T_g of 71°C and a polyurethane having a T_g of 38°C as the binder resin system of layer b in Ejiri, as the reference specifically teaches examples utilizing this combination of polymers.

44. Claim 21 is met as set forth above for claim 18.

45. Regarding claim 23, Ejiri teaches that suitable carbon black for use in layer b include Black pearls 2000, as well as other carbon blacks (column 45, lines 35-60).

46. Therefore it would have been obvious to one of ordinary skill in the art to utilize Black pearls 2000 as the carbon black in layer b of Ejiri, as the reference recognizes the equivalence of this carbon black to the others listed as suitable.

47. The examiner acknowledges that the Ejiri reference does not teach using a "large" carbon particle material. However, the examiner notes that Black pearls 2000 is listed in the instant specification as a carbon black that is suitable for the magnetic layer of the instant invention. Thus, the examiner considers this limitation met when Black pearls 2000 is utilized as the carbon black in layer b of Ejiri.

48. Regarding claim 24, Ejiri teaches a specific composition for layer b that meets most of applicants claim 24 requirements. Specifically, Ejiri teaches a layer b composition containing ferromagnetic powder, alumina (equivalent to aluminum oxide),

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carbon black, a polyurethane, a vinyl chloride, butyl stearate (fatty acid ester), and stearic acid (fatty acid) (column 60, lower table, composition for layer b). Though this composition does not disclose that a "large" carbon particle material is utilized, the examiner maintains that this limitation is met as set forth above for claim 23. Though this particular composition does not appear to contain a hardener, Ejiri teaches that the resin binder for layer b can additionally contain a polyisocyanate, which is a known curing agent for polyurethanes (column 49, lines 15-45). Thus, applicant's requirement of a curing agent is met when a polyisocyanate is utilized in layer b.

49. Regarding claim 25, Ejiri teaches forming a back coat on the opposite side of the support from layer a and layer b (column 51, lines 54-60).

50. Regarding claim 26, Ejiri teaches a composition for the back coat layer meeting all of applicants claim 26 requirements (see column 86, lines 10-25).

51. Claims 11 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ejiri as applied to claims 6 and 18 above, and further in view of Erkkila et al. (US5501903).

52. Ejiri as set forth above fails to teach that the use of a nonhalogenated binder resin for layer a and layer b, as required by claims 11 and 22. However, it is specifically noted that Ejiri teaches the use of a vinyl chloride copolymer.

53. Bearing this in mind, Erkkila et al. (Erkkila) teaches that magnetic media employing a binder containing a vinyl chloride copolymer component and a soft polyurethane component exhibit disadvantages as a result of the vinyl chloride

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copolymer. This is because over time the polymer degrades, releasing gaseous HCl, which can change the properties of the media as well as corrode the recording head (column 1, lines 45-55 and column 2, lines 31-40).

54. To prevent this problem, Erkkila utilizes a binder comprising a nonhalogenated vinyl copolymer, wherein the vinyl copolymer comprises 5-40 parts by weight methacrylonitrile, 30-80 parts by weight of a nonhalogenated non-dispersing vinyl monomer, 5-30 parts by weight of a nonhalogenated hydroxyl functional vinyl monomer, and 0.25-10 parts by weight of a nonhalogenated vinyl monomer bearing a dispersing group (column 4, lines 15-30). This copolymer contains pendant nitrile, hydroxyl, and dispersing groups (column 7, lines 10-20).

55. Therefore it would have been obvious to one of ordinary skill in the art to substitute the nonhalogenated vinyl copolymer taught by Erkkila for the vinyl chloride copolymer utilized in both layer (a) and layer (b) of the magnetic recording medium taught by Ejiri.

56. One would have been motivated to make this modification in view of the teaching in Erkkila that the negative aspects of vinyl chloride copolymers can be avoided by utilizing a nonhalogenated vinyl copolymer system. One would have been motivated to specifically use the composition in Erkkila because Erkkila teaches it as a substitute for a vinyl chloride polymer, and because it is composed of the same components (aside from the use of a nonhalogenated vinyl chloride) as that of the vinyl copolymer utilized by Ejiri.

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57. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ejiri as applied to claim 26 above, and further in view of Saito et al. (US6254964).

58. Ejiri fails to teach that the back coat layer contains a metal oxide selected from titanium dioxide, iron oxide, aluminum oxide, and a mixture thereof, as required by claim 27.

59. However, Saito teaches that by incorporating a metal oxide such as iron oxide or aluminum oxide into the back coat of a magnetic recording medium, the hardness of the backcoat is increased, thereby increasing the running durability of the medium (column 40, lines 35-40 and 54-57).

60. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize aluminum oxide or iron oxide in the back coat of Ejiri as modified by Erkkila, in view of the teaching in Saito that adding one of these oxides to the backcoat of a magnetic recording medium improves the running durability of the medium.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhlir whose telephone number is 571-272-1517. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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D. S. NAKARANI
D. S. NAKARANI
PRIMARY EXAMINER